

Outbreak of Gastroenteritis Caused by *S. typhimurium* Acquired From Turkeys

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AN OUTBREAK of gastroenteritis in a large, maximum-security penal institution afforded an opportunity to obtain additional evidence on the spread of *Salmonella typhimurium* by turkeys. In this instance the turkeys apparently were recontaminated after they were cooked.

Circumstantial evidence accumulated during recent studies indicates that fowl may be the vehicle of etiological agents in some outbreaks of diarrhea (1-5). Seldom, however, have the epidemiological indications been corroborated by bacteriological data, partly because the suspected items of food were not available when investigations were undertaken.

Nevertheless, it is manifest from observations that fowl may serve as the vehicle of *Salmonella*. In a study by Mosher and others (6) turkeys were implicated as the source of *Salmonella* infections on epidemiological grounds. In a 5-year study of the occurrence of *Salmonella* in fowl, Galton and associates recovered the organism from 14.5 percent of 434 chickens and turkeys examined (7). In one phase of the study they found that 16 percent of 1,244 specimens from fowl in 3 poultry processing plants were positive for *Salmonella*. The highest percentage of isolations were from the edible viscera, and *S. typhimurium* was the most prevalent type.

Description of the Outbreak

The outbreak first became evident during the afternoon and evening of November 27, 1954, when a number of prisoners reported to the hospital clinic complaining of severe nausea, vomiting, cramps, and diarrhea. Temperatures ranged from 99.6° F. to 104° F., and white

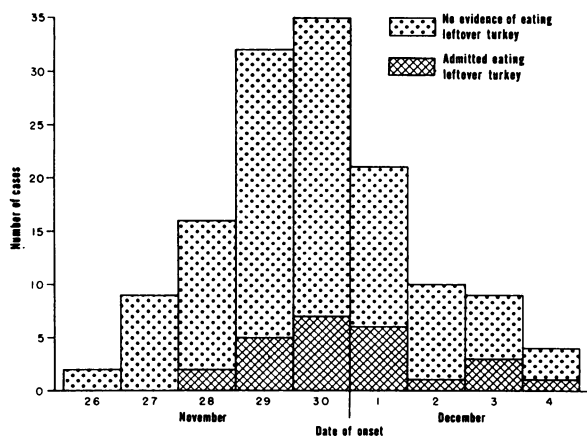
blood cell counts from 10,000 to 14,000 per cubic millimeter. No gross blood was noted in the stools. The illness was short except for those patients with sustained fever. Reports of illness characterized by these symptoms continued through November 30. Approximately 200 cases among the 2,700 prisoners were reported, 30 of the patients requiring hospitalization. Most of the ill persons were among the 300 men who worked in the prison mess or in the hospital.

Although an epidemic of food poisoning, presumably caused by *Salmonella*, was suspected when the first series of cases was reported, food histories obtained initially yielded few clues. The turkey left over from Thanksgiving dinner on November 25 was suspected since the prisoners involved had access to the kitchen and could have taken leftover food. This suspicion was confirmed later by two patients who reported that they were offered turkey sandwiches by fellow prisoners on November 27. In an unsigned questionnaire completed December 3 by 155 of the prisoners who had been ill, 25 admitted eating turkey other than that served at the Thanksgiving meal (see chart).

On November 29, when intensive investigation of the epidemic began, specimens on rectal swabs were obtained from 20 of the more acutely ill patients in the hospital. These were plated directly on SS agar and inoculated into tetrathionate broth to which brilliant green dye was added. After 18 hours incubation at 37° C., the broths were streaked to brilliant green agar. Sixteen, or 80 percent, of these cultures were positive for *S. typhimurium*. In vitro disk sensitivity tests indicated that the organisms isolated were sensitive to oxytetracycline. Therapy was started by administering this drug to 21 patients who had sustained fever.

Mr. Mackel, bacteriologist-epidemiologist, and Dr. Payne, an epidemiologist, were with the Enteric Disease Investigations Unit, Epidemiology Branch of the Communicable Disease Center, Atlanta, Ga., at the time of this study. Dr. Payne was chief of the unit. Both are currently assigned to the Communicable Disease Center Field Station, Phoenix, Ariz. Dr. Pirkle is medical director, Bureau of Medical Services, Atlanta.

Proportion of persons who admitted eating leftover turkey during outbreak of gastroenteritis.



An initial treatment of 2 gm. was given, followed by 1 gm. per day for 6 days.

The mess steward who sliced the turkey Thanksgiving morning became ill Friday afternoon, November 26. He reported that he had eaten a considerable amount of turkey while slicing it. His specimen was positive for *S. typhimurium*. This was apparently the first illness in the outbreak.

On November 29 and 30, illness was reported among some of the prison officers who on November 26 and 27 had eaten sandwiches which were prepared from turkey left from the Thanksgiving meal. Visits to the homes of the guards on sick leave revealed five ill persons, all of whom had eaten the turkey sandwiches but only one of whom had eaten turkey at the Thanksgiving meal. Cultures of specimens taken from all five were positive for *S. typhimurium*.

On the third day of the investigation, December 1, rectal swabs were obtained from 300 mess personnel who handled food. These swabs were placed in brilliant green tetrathionate broth. After incubation the broths were plated on brilliant green agar. Of these, 100, or 33 percent, were positive for *S. typhimurium*. About 40 percent of the persons infected denied enteric symptoms.

All of the infected food handlers were removed from mess duty and submitted specimens daily until two consecutive examinations were negative. The persistence of infections is shown in the table. Assuming infection oc-

curred on November 28, 30 percent of the patients harbored *S. typhimurium* for at least 14 days, and one person was positive after 4 months. Most of the individuals were not followed after two consecutive negative tests, but some who remained negative were continued at their request. No specimens were collected after 4 months.

Turkeys intended for the Thanksgiving dinner were delivered by a large meatpacking company on November 15. When, soon after delivery, the mess steward noticed that the turkeys were unfrozen, the supplier was requested to pick up these birds and to replace them with frozen turkeys. The replacements were received November 19, and the frozen turkeys were held at 28° F. until prepared in the prison butcher shop on November 24, the day before Thanksgiving. After roasting, the turkeys were returned to the butcher shop and sliced on the same chopping block where they were prepared for roasting. The block allegedly was cleaned with soap and water between the two operations.

Persistence of *Salmonella typhimurium* infection in 100 patients, determined by rectal swab culture

Days following infection	Patients with positive cultures	
	Number	Percent
Initial	100	100
14	30	30
24	13	13
45	6	6
65	3	3
100	1	1
121	1	1

Slicing began about one o'clock Thanksgiving morning, November 25, and continued until just prior to dinner. The slices were placed in large pans about 6 inches deep and weighed. The amount necessary for dinner was steamed at 220° F. under pressure for 10 minutes. The turkey not needed for the meal was returned to the refrigerator without reheating. Turkey which was not reheated and that which remained on the serving line after dinner was used for the officers' lunches. Apparently,

large amounts of this turkey also were obtained surreptitiously by the prisoners.

With the assistance of officials from the Food and Drug Administration, swabs were taken from various areas in the kitchen on November 30. The meat chopping block, other utensils, and the handles of knives used in cutting the meat were examined. Swabs were placed in brilliant green tetrathionate broth and streaked to brilliant green agar. All the cultures were negative for *Salmonella*.

None of the sliced turkey was available for examination, but the uncooked necks had been frozen for use in soup. One dozen of the frozen necks were selected randomly, divided into four pools, and homogenized in a food blender with 150 ml. of brilliant green tetrathionate broth in each pool. *S. typhimurium* was recovered from one of the four pools.

Discussion

Epidemiological and bacteriological data indicate that this outbreak of gastroenteritis was caused by turkey meat infected with *S. typhimurium*. The case studies indicate that illness occurred only in the group who had eaten the turkey which was not reheated after being sliced. This strongly suggests that (a) the turkeys were infected originally, (b) the chopping block was contaminated when the birds were prepared for roasting, and (c) the cooked birds were recontaminated from the chopping block. Reheating apparently was sufficient to destroy *Salmonella* on the contaminated meat.

The severity and duration of symptoms in this outbreak are consistent and characteristic of *S. typhimurium* infections. Patients treated with oxytetracycline responded well clinically. The persistence of infections compares closely with those reported by Mosher and others (6),

who observed an infection 4 months after the beginning of an outbreak.

Summary

Studies were made of an outbreak of gastroenteritis involving about 300 inmates of a penal institution. All of the patients investigated had eaten roasted turkey which had been sliced on the same chopping block on which the uncooked fowl had been prepared. No other persons became ill after eating only reheated meat from the same birds.

Salmonella typhimurium was recovered from more than 100 persons who had eaten the contaminated meat and from turkey necks which had been frozen.

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Legal note . . . Municipal Control of Air Pollution

Constitutionality of Detroit Smoke Control Ordinance upheld in case involving municipal control of air pollution by vessels in interstate commerce. *Huron Portland Cement Co. v. City of Detroit*, 93 N.W. 2d 888 (1959).

The Smoke Abatement Code of the City of Detroit makes it unlawful to permit the emission within that city of smoke of a density equal to or greater than that designated as No. 2 on the Ringlemann Chart, and provides penalties for its violation.

A complaint filed by the city charged the Huron Portland Cement Co. with permitting two of its steamships operating in interstate commerce to emit dense smoke at the Port of Detroit contrary to the provisions of the code. The company then sued to enjoin the prosecution of the complaint, claiming the ordinance unconstitutional except insofar as any objectionable smoke was caused by the improper firing or other improper use of the equipment of the vessel. The court denied the injunction and held that the ordinance was constitutional. The company then appealed to the Supreme Court of the State of Michigan, claiming that (a) in the exercise of its power to control interstate commerce Congress had preempted the field by providing for inspection and control of American vessels on the Great Lakes, and (b) even if there had been no preemption by congressional action, the Detroit ordinance unduly burdened interstate and foreign commerce in matters where uniformity was necessary. The Supreme Court of Michigan rejected the contentions of the company and upheld the ordinance.

The constitutional grant of authority in Congress to regulate interstate and foreign commerce, the court noted, does not preclude all State action which may indirectly or incidentally affect that commerce. Unless it conflicts with or is superseded by legislation of Congress in the exercise of its superior authority in this

area, and as long as its effect on interstate commerce is only indirect and incidental, legitimate and reasonable State action with respect to a matter of local or internal concern is valid as an exercise of the police power of the State.

The court declared that the Federal legislation involved (46 U.S.C.A. Ch. 14) was intended primarily for the protection and safety of vessels, their passengers, crew, and cargo, and not designed or enacted for the protection of persons or property on land. The Smoke Abatement Code, the court held, was, on the other hand, intended solely to protect the health and welfare of the residents of Detroit by preventing the emission of dense smoke into the air, and it was not intended as a regulation of interstate commerce. In view of the differing subject matter, the Federal and local laws were thus held not to be in conflict, and the effect, if any, of the local ordinance on interstate commerce was declared to be only incidental to its purpose.

Turning to the question of the appropriateness of local air pollution ordinances as a reasonable exercise of the police power, the court stated that "by now it is sufficiently clear without citation of authority that excessive air pollution by dense smoke cannot be anything but harmful to the health and welfare of the community." The court also noted the increasing national concern with air pollution and referred to the Federal Air Pollution Research and Technical Assistance Act of 1955 (42 U.S.C. 1857) as indicating congressional approval and encouragement of local action to abate air pollution.

Recognizing the needs of our industrial society, however, the court concluded that a smoke

control ordinance may be said to be reasonable if it does not unduly hamper industry. Thus, the court conjectured, if the ordinance had attempted to prevent the emission of all smoke or if adequate means of smoke control were not available, another question might have been raised. The Detroit ordinance, however, the court pointed out, sought to outlaw only the emission of smoke of such density as to be readily prevented by the use of modern smoke equipment. The court stated, "All it costs is money." It concluded that the ordinance was a reasonable exercise of local police power and did not unduly interfere with interstate commerce.

With respect to the company's second contention, the need for uniformity, the court reasoned that the Detroit ordinance should not be held invalid simply because of the possibility that ordinances at other ports, applicable to the company's vessels, might be more stringent and require changes in equipment. It was suggested that the company might avoid this possibility by employing the most modern devices available to reduce smoke to the least possible density. Although the court conceded that the subject might well call for uniform Federal legislation, short of such action, the court held the Detroit ordinance was within the proper exercise of the police power.

A Bulwark Against Senility

Philadelphia has undertaken a constructive experiment to prevent mental deterioration among the aged.

In an effort to demonstrate that senility is not inevitable and can be prevented, the Frederic R. Mann Recreation Center was opened in November 1958. The first of its kind in the Nation, the center provides to adults 60 years of age and older who are capable of traveling to and from the center unaided, the services of an occupational therapist, three recreation leaders, a psychiatrist, psychologist, psychiatric social worker, public health nurse, and physician. It has a capacity of 200.

The idea grew from studies by Dr. Maurice E. Linden, director of mental health in the Philadelphia Department of Public Health, who found that one-third of all mental hospital admissions in the city were in the upper age group.

Dr. Linden has long held that senility is a misnomer. It is his belief that aged persons need not break down mentally if they are given a constructive social environment and opportunity to develop hobbies and other occupational, mental, and social interests.

The center is a cooperative enterprise of the Pennsylvania State Department of Public Welfare and the Departments of Public Health and Recreation of Philadelphia.

An article describing the center's activities will appear in a forthcoming issue of *Public Health Reports*.

Signs

and

Symptoms

of trends in public health

Hot and humid working conditions increase fatigue in workers, endanger their health, and diminish their efficiency, observes Dr. Lucien Brouha of the Haskell Laboratory of Industrial Toxicology, Wilmington, Del.

He points out the need for efficient ventilation, properly insulated sources of heat, screens, special clothing, and special tools and methods to enable men to work as far as possible from a source of heat, rest periods in cooled and dehumidified air, and a measured intake of water in the right quantity and at the right time.

Water should be drunk from cups, he says, to cut down on amount of swallowed air and to permit measurement. He feels also that salt loss can generally be offset by adding enough salt to the food at every meal.

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The first positive proof that mammalian embryos are extremely sensitive to X-rays in the earliest phases of development following conception has been obtained by Columbia University radiobiology researchers, Prof. Roberts Rugh and his assistant Erica Grupp.

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Experiments on fish suggest that an outlet for primary aggressiveness may be as important as love. Dr. Konrad Lorenz, head of the Max Planck Institute for Comparative Ethnology, found that the cichlid, a tropical fish, will kill his mate unless other fish are around as victims. The attack need not be physical; the cichlid needs only to see other fish for his aggressions to have an outlet.

More than a third of 88 million automobile drivers in this country have below-average vision, and 15 percent of that group have eyesight so poor they are dangerous drivers, the Better Vision Institute reports. One major criticism of standard eye tests for licenses, they said, is that both examinee and chart are motionless, without regard to the effect of speed on visual perception.

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According to the New York Interdepartmental Health Resources Board, 4 out of 5 hospitals in New York State, and 9 out of 10 in New York City, refuse to admit alcoholics.

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The Office of Vocational Rehabilitation reports a record of 74,320 persons rehabilitated during fiscal year 1958, 3,380 more than in 1957. An additional 18,584 have been prepared for work but have not yet found employment.

Estimates indicate that the men and women rehabilitated during the year will increase their earnings from \$22 million to about \$148 million in their first full year of employment. They will contribute about 114 million man-hours to the Nation's labor force.

Nearly 15,000 of these people had been receiving public assistance at an annual cost of \$14 million, whereas the total, one-time cost of rehabilitating them was about \$13 million.

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Vermont's Alcoholic Rehabilitation Commission uses brief case histories and entries from the journal of a caseworker in the latest report on its activities.

The new alcoholics' rehabilitation program in Washington, D.C., has resulted in a saving of \$12,000 a month, municipal court officials estimate. At least 150 persons per month are referred for treatment instead of being sent to prison, not only helping alcoholics but saving jail costs of \$2.87 a day per patient.

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A 2-year study by the New Jersey State National Council indicates that 4 out of 5 New Jersey teenagers eat poorly, but boys are better nourished than girls. Only 1 out of 10 high school girls drinks enough milk, and more than one-fourth of the girls and one-seventh of the boys had eaten no breakfast the day before they were questioned. Many lack vegetables and fruits rich in vitamin C in their diets.

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Aged stroke victims are walking out of D.C. General Hospital in Washington, D.C., capable of complete self-care. Of 3,000 stroke victims admitted to the hospital in the last 8 years, 90 percent responded to vigorous restorative treatment. Their stay in the hospital has been cut in half with treatment and, when released, they remain active in their homes.

The patients who retrogressed after leaving the hospital were found to be in homes of well-meaning but ill-informed relatives who insisted that the stroke victim return to bed.

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One in six of New York's families is ill-clothed, ill-housed, and ill-fed, finds the State's Interdepartmental Committee on Low Incomes. The committee urges more attention to rehabilitation of the aged, the handicapped, and the mentally ill in a war against poverty.

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Slipping and tripping, rather than stumbling on obstructions, are the chief causes of falls on steps and stairways in farm homes, reports the Michigan Experiment Station, U.S. Department of Agriculture. The finish or covering material on stairs and the uniformity of steps are important safety considerations.

Federal Publications

Natural Fluoride Content of Communal Water Supplies in the United States. *PHS Publication No. 655; 1959; 111 pages; 60 cents.*

The 1,903 communities listed in this census of naturally fluoridated water supplies have at least one water source containing 0.7 ppm or more fluoride, the minimum level for optimum protection from dental caries.

Statistical information is presented for naturally fluoridated water sources by fluoride content, State, and size of community.

Health Statistics From the U.S. National Health Survey. Impairments by type, sex, and age. United States, July 1957-June 1958. *PHS Publication No. 584-B9; 1959; 28 pages; 25 cents.*

Estimates of visual, hearing, and speech defects, loss of extremities, paralysis, and other neurological or orthopedic defects and abnormalities are presented. The tables show impairments involving bed disability days and the number and percent of impairments caused by injury. Medical care status and major activity of handicapped persons are also tabulated.

Appendixes carry technical notes on methods, definitions, and coding classifications, and the questionnaire on which the information was obtained.

Annual Report, U.S. Department of Health, Education, and Welfare, 1958. *HEW Publication (Unnumbered); 1959; 262 pages; 75 cents.*

Progress and cooperation comprise the theme of the Secretary's report to the President.

Activities of the Social Security Administration, Public Health Service, Office of Education, Food and Drug Administration, Office of Vocational Rehabilitation, and Saint Elizabeths Hospital are described in detail. Short discourses on the functions of the American Printing

House for the Blind, Gallaudet College, and Howard University are also presented.

Pointing out that international programs exist in all phases of the Department's work, the report emphasizes the basic needs of all peoples.

Glaucoma References. *PHS Publication No. 664; 1959; 15 pages; 10 cents.*

Methods used in diagnosing early glaucoma, medical and surgical treatment, hereditary and geriatric factors, glaucoma surveys, community casefinding programs, and vision conservation programs are the major topics of this annotated bibliography for professional workers and students in the field of public health.

Pertinent films and pamphlets are also cited with brief descriptions of their content, use, and availability. Annotations are grouped under the major categories of community aspects, clinical aspects, films, and pamphlets.

Salaries of Local Public Health Workers, August 1958. *PHS Publication No. 656; 1959; 40 pages.*

Data in this report, taken from questionnaires submitted to local health departments, boards of education, and nonofficial health agencies, cover salaries of some 12 occupational groups of professional personnel. Frequency distributions of salaries are shown by population of area served and by Bureau of Census region.

Scientific Directory and Annual Bibliography, National Institutes of Health, 1959. *PHS Publication No. 667 (Public Health Bibliography Series No. 24); 1959; 100 pages.*

Listing all key personnel, staff members with doctorate degrees, and visiting scientists with tenure of a year or more, the directory reflects the organizational structure of the

National Institutes of Health, Public Health Service, as of February 1959.

The bibliography itemizes papers published during 1958 which present original work of scientists at the Institutes. Alphabetized by senior author with the entries listed under the organizational entity to which he was attached when the work was done, it indicates the accomplishments of each unit.

Individual contributions are recognized in the alphabetical index of all authors and names in the directory.

The National Cancer Institute. *PHS Publication No. 458; revised 1959; 24 pages; 20 cents.*

Organization and functions of the National Cancer Institute, National Institutes of Health, are discussed in detail. Included are descriptions of the types of research conducted, the national chemotherapy program, and programs to assist in early diagnosis and treatment of cancer. Specific information is given about professional training and research grants.

Screening for Glaucoma. *PHS Publication No. 666; 1959; 23 pages; 25 cents.*

Eight glaucoma detection programs conducted in various communities prior to February 1957 are described. Directed to those planning casefinding surveys, this booklet covers sponsorship, test population and procedures, referral, and followup techniques.

A summary of operations and findings is given for each program discussed.

Manual of Recommended Practice for Sanitary Control of the Shellfish Industry. Part I. Sanitation of shellfish growing areas. *PHS Publication No. 33; revised 1959; by Eugene T. Jensen; 36 pages; 45 cents.*

Administrative and technical procedures for the States, Public Health Service, and shellfish industry are suggested. Separate sections deal with laboratory methods, growing area survey and classification, prep-

aration of shellfish for marketing, and control of harvesting from closed areas. Information on bacteriological criteria and inspection of certified shippers is provided in the appendixes.

A companion to PHS Publication No. 33, part II, 1957 revision, this manual supersedes its 1946 edition. Both parts were prepared with assistance from State shellfish control agencies, industry associations, and interested U.S. and Canadian Federal agencies.

Indians on Federal Reservations in the United States. A digest. Aberdeen Area. PHS Publication No. 615, part 3; 1959; 73 pages.

Brief information about Federal Indian Reservations in Nebraska, North Dakota, South Dakota, Iowa, Michigan, Minnesota, and Wisconsin is contained in this digest. The population groups, their homes, education, and income, and their health status and services are discussed. Included also is a description of the location, ownership, and topography of reservation land.

Review of the Second Conference on Progress and Potentials in Leprosy Investigations. PHS Publication No. 641; 1958; 36 pages.

Abstracts of selected papers provide a brief review of conference highlights. A substantial portion discuss the deficiencies in knowledge about leprosy. Other reports deal with clinical observations, evaluation studies, and the epidemiological and immunological aspects. The discussions of obscure mycobacterial diseases of man and animals are also covered.

Bibliography of Military Psychiatry, 1952-1958. PHS Publication No. 693; 1959; by Charles Roos and Jeanette Barry; 83 pages.

A continuation of the "Bibliography of Military Psychiatry, 1947-52," these 736 references relate directly to the military situation or involve United States military personnel. They are arranged in 17 categories and many are briefly annotated. An author index is provided.

Although intended primarily for military psychiatrists and psychologists, this bibliography should be a useful tool for civilian mental health personnel and medical librarians.

Seasonal Variations of Births in the United States, 1948-54. Vital Statistics—Special Reports; Selected Studies; vol. 47, No. 4; Apr. 24, 1959; pages 127-143.

Current seasonal patterns in the birth rate are obtained and comparisons made between the years covered and earlier years. Supported by tables and charts, they show variations between races and different geographic regions of the Nation.

Derivation of a seasonal index and its use in adjusting series of monthly birth rates are demonstrated. Types of fluctuations and different methods of computing the index are also considered.

Highlights of Progress in Mental Health Research, 1958. PHS Publication No. 659; 1959; 40 pages; 20 cents.

Selected studies by the National Institute of Mental Health's scientists and grantees during 1958 are described. Areas covered include biological and behavioral aspects of schizophrenia, biochemical bases of behavior, brain and behavior, learning and perception, psychopharmacology, and drugs and behavior. Epidemiology, personality development, the child's relation to his family, the disturbed child, alcoholism, aging, and psychosomatics are also included.

The work and findings discussed point up the multidisciplinary approach that has characterized mental health research during the past few years.

Grant and Award Programs of the Public Health Service. Volume I. Policy and information statement on research grants. PHS Publication No. 415; revised 1959; 19 pages.

Purpose and availability, application procedures, restrictions, and other details are described. In addition to general information, spe-

cific information is given about grants for pilot projects, constructing and equipping health research facilities, and field investigations in cancer, neurological and sensory disorders, and mental health.

Organization and Staffing for Local Health Services, January 1, 1958. PHS Publication No. 682; 1959; by Clifford H. Greve and Josephine R. Campbell; 60 pages; 40 cents.

The organization and staffing of 1,480 local health units are analyzed.

Tables and charts show extent of coverage of the Nation by local health organizations, selected characteristics of organized areas, financial capacity of those areas and their expenditures for public health, and public health personnel employed by official health agencies and by other official agencies.

VD Fact Sheet. PHS Publication No. 341; 15th revision; 1959; 22 pages. Latest statistics on venereal disease incidence, prevalence, and treatment. Supersedes previously published data.

Tuberculosis. PHS Publication No. 30 (Health Information Series No. 33); revised 1959; 13 pages; 10 cents, \$6.50 per 100. Revised to emphasize the newest developments in detection and treatment. Also describes the bacillus, its transmission, and the course of the disease, dispelling many popular beliefs about tuberculosis.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications other than its own.
